

THE MYSORE LAC INSECT

BY

S. MAHDIHASSAN

(With two plates and 1 text figure)

An orthodox systematist should look upon a given insect as the duplicate of a type kept in some museum. This means that in that species any one individual is so much like another that any two of them can be easily compared. This is usually so when morphological characters are well developed and of which many are present. On the contrary the lac insects, like many other coccids, are morphologically degenerate organisms, with very few features to distinguish. This apparent degeneration has been brought about by their high physiological activity which could be very well exploited in their classification, although it has not been done so far. There is a similar problem in systematic biology where some yeasts are classed as unknown fungi when there is every suspicion of their being ascomycetes which have only lost their property of forming ascospores. The microbiologist is therefore contented to differentiate them into varieties, or ultimate biological units, even though he cannot properly place them in genera. When yeasts are examined the cells of one type resemble those of the other so closely that their shape cannot form the basis of any recognition. Further, within the same species, the cells may vary so much that their morphology cannot be specified. Even their ordinary colonies look so much like one another that they cannot be recognised thereby. But once they are allowed to form giant colonies each reveals its own special feature. Comparable with yeasts we find that individual lac insects show many characters in common so that the specific features are not well indicated and further there is often so much polymorphism that its interpretation becomes difficult. This explains how the majority of entomologists believe that there is only a single species from Kashmir to Travancore and from Sind to Tonkin.

The lac insect is a highly gregarious insect. It normally forms what may be called a giant colony or stick lac and the minute morphological and physiological differences, difficult to observe separately, are obvious in their totality by comparing specimens of stick lac belonging to two different species of lac insect. On the contrary it is more difficult to examine the same lac insects as individual specimens. Just as it is easy to tell at a glance a honey comb built by a small bee from that formed by a larger species, so can two specimens of stick lac be characterised when properly studied. Microbiologists have tried to interpret the difference between the smooth and rough colonies of the same species of bacterium. When likewise we try to analyse the difference in the final structure of stick lac belonging to two lac insects we get to some concrete results. The species *Lakshadia communis*, even in the larval stage, does not spread out its colony so intensely as does *Lakshadia chinensis*. The result is that, by the time the giant

colony is formed, many individuals are dead but in different stages. This feature, which is hardly morphological, is nevertheless observable and has been illustrated already (1). Pressed by their neighbours the competition for space makes their bodies assume bizarre forms, another feature not found in any other species. When we come to the Mysore lac insect we find certain features not existing in other species, and these are being illustrated in this communication.

Lakshadia mysorensis is the only insect which has three life cycles a year, and while its productivity has increased its size has decreased, just as is the case with the polyvoltine silk worms. All lac insects, when they settle on a horizontal twig, settle only on the side facing the earth. On a vertical twig they settle all around it forming a regular envelope. But no vertical twig would be ideal so that even what appears as perpendicular may have its ventral and dorsal aspects, slightly inclined to the earth or away from it. When a cross section of such a twig is taken even the structure of the wood shows that the side inclined to the earth has more concentric lines while the dorsal side has relatively flat circles. The insects feeding on the ventral side also grow better than those on the dorsal. Thus the growth of the rings in the section of a twig and of the insects on that side show a distinct harmony. Fig. 1 is such a section of a *Shorea talura* twig, represented by the white inner circle, surrounded by a number of lac insects of *Lakshadia mysorensis* fixed to its periphery. The season of collection was at the end of the monsoon season, when the best growth, both of the wood and of the insects can be seen, as in Fig. 1. The insects on the ventral half, marked V, of the cross section of stick lac, are larger than on the other half, representing the relatively dorsal side of the twig, D.

Fig. 1 shows a wheel-like figure. The central white portion, as mentioned, represents the twig with its rings of wood; the periphery is occupied by lac insects separated from one another by a spoke-like partition, being a thin membrane of lac secretion. The architecture of stick lac has been dealt with separately and on consulting it (2) the value of the present paper would be greatly increased. What is obvious is that the insects, even the largest of them, are small compared with others so far illustrated. Fig. 1 shows one insect marked 'a' as very much elongated and its length can be looked upon as the ideal for *L. mysorensis*. Yet it does not compare with that of *L. communis* or of *L. chinensis* previously illustrated elsewhere (2). Fig. 1 shows an empty cell 'b', typical of this species, almost like a narrow ellipse.

In 1901, George Watt (3) wanted to publish a monograph on lac which was issued in 1904. He probably had samples collected from different parts of India. Mysore must also have contributed to this collection which was partly deposited in the Economic Museum, Bangalore, where specimens dated 1901 are found. Mr. Trimulachar, the former Superintendent of the Museum, kindly gave me one piece from this collection. Fig. 2 shows a cross section of the dry twig as a white circular central portion. The dorsal periphery, comparable with D in Fig. 1, shows insects less developed than on the ventral half, (Fig. 2.V). The dried insect (marked 'a' in Fig. 2) compares with 'a' of Fig. 1, already mentioned. Likewise empty cells in Figs. 1 and 2 (marked in both as 'b') show a narrow elliptical outline. The

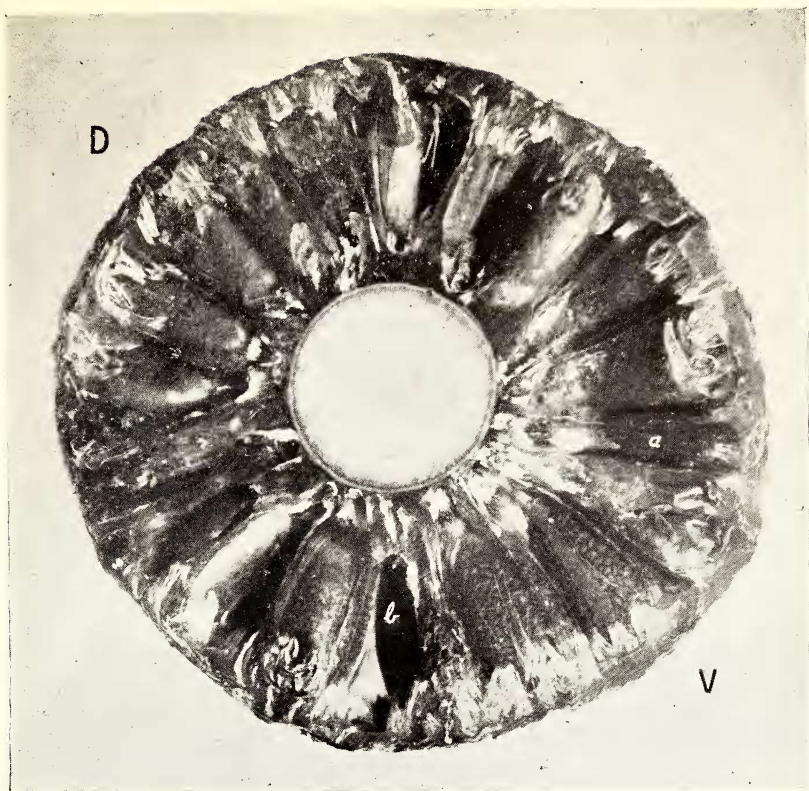


Fig. 1.

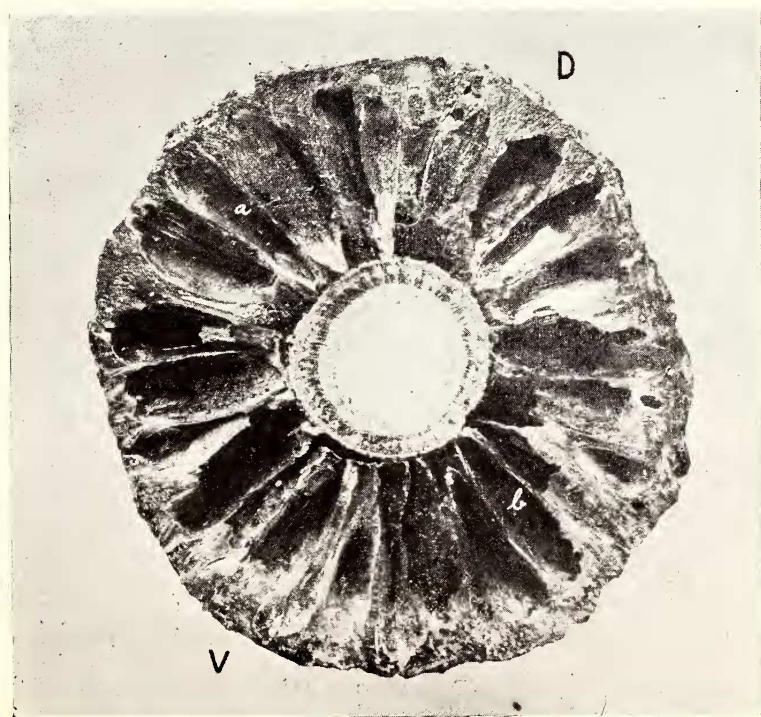


Fig. 2.
(Explanation at end)



Fig. 3.



Fig. 5.
(Explanation at end)